

## **IN THE SPECIFICATION**

**Please replace the last paragraph on page 23 of the application that extends onto page 24 of the application with the following paragraph:**

During a selected number of turn-ups, a chemical strengthening agent, Hercobond, was added. Hercobond increases the web 38 strength so that there is a more likely probability of a successful turn-up. When the tension apparatus 74 was placed under the tissue machine, the tension apparatus 74 was able to accurately pick up the addition of Hercobond. Before the Hercobond was added, the tension was approximately 10.3 Newtons per meter-squared. After the addition of Hercobond, the peak of the tension averaged to 12.4 Newtons per meter-squared. Figure 9 shows the tension being increased as Hercobond was added 2000 yards before the turn-up. The web speed  $v$  was 3906 feet per minute, meaning that the chemical addition occurred 92 seconds before turn-up. The timing of Hercobond addition is noted in Figure 9. The downward spike of tension immediately before the turn-up is unrelated to the Hercobond addition as this is the moment when the web 38 is being blown over a new roll before being attached thereon. After the turn-up, it took approximately 5 minutes before the tension returned to its original level while the Hercobond was phasing out of the process.

**Please replace the first full paragraph on page 25 of the application with the following paragraph:**

The tension apparatus 74 was also able to note a change in crepe ratio. A machine onto which the present experiment was conducted, tissue machine #1, normally runs at a 1.28 crepe ratio. For approximately two minutes the crepe ratio was changed to 1.26 to determine whether the tension apparatus 74 could pick up the change. Figure 11 shows the change in crepe ratio that the tension apparatus 74 detected. The error bars shown are with a 99% confidence level. At 1.26 crepe ratio, the average tension was 9.4 Newtons per meter squared, and at the 1.28 crepe ratio the average tension was 8.9 Newtons per meter squared. For a higher crepe ratio, the tension should be lower, meaning that the tension apparatus 74 accurately picked up the change..

**Please replace the last paragraph on page 25 of the application that extends onto page 26 of the application with the following paragraph:**

Across a tissue web 38, the goal is to keep the moisture profile and basis weight uniform. Here however, the moisture profile and basis weight was not uniform. Therefore, the tension across the tissue web 38 is also not uniform. When the tension apparatus 74 was placed under the web 38, it was moved in six different positions within one foot to determine

whether there were any variations in the cross direction. Data was collected at each position for approximately two minutes and then was repeated in a random manner to eliminate time variables. Figure 12 shows the cross directional profile that the tension apparatus 74 recorded.

The error bars shown are with a 99% confidence level. At 56 inches from the drive side, the tension averaged to 10.6 Newtons per meter squared.

At 75 inches across, the tension averaged to 9.5 Newtons per meter squared. Using data from tissue samples correlating with previous strength properties, this 11.4% increase in tension relates to an 18.2% increase in cross directional strength and a 19.4% increase in MD strength. There is a statistical difference between the last four inches on the chart. However, upon examining the scanning profile of the basis weight and moisture profiles, the differences were not correlated to any specific variable on the profiles.

**Please replace the last full paragraph on page 26 of the application with the following paragraph:**

Tension sensor 74 was used to examine a full softroll to determine whether there were any noticeable trends throughout the roll. A typical softroll takes approximately 30 minutes to run. Figure 13 shows data obtained through a measurement of the softroll. In the present experiment, before the softroll was started, the roll prior to it had broken

on the turn-up. When this occurs, Hercobond was added to help get the web 38 back onto the roll. The addition of Hercobond explains the downward trend in the tension for the first six minutes as the Hercobond was phased out of the system. Throughout the rest of the roll, there were not any dramatic trends. The roll maintained a fairly constant tension at around 9.0 Newtons per metered ~~squared~~. Figure 13 includes a turn-up at the end without using Hercobond.

**Please replace the last paragraph on page 26 of the application that extends onto page 27 of the application with the following paragraph:**

Another measurement that was conducted involves the installation of a DDWS foil onto the tissue machine. In theory, the foil provides a layer of air onto which the web 38 rides along, therefore stabilizing web 38. Usually, the foil is under the web 38 and is rarely used by the operators since CD and MD stability does not seemingly benefit. The foil was raised for a few minutes to determine whether or not it helped with stability. Figure 14 shows that the tension was fairly stable at about 8.8 Newtons per meter ~~squared~~ while the foil was not contacting the sheet. Once the foil was raised, the tension became unstable and higher at about 9.0 Newtons per meter ~~squared~~. Presumably, the increase in tension is caused by the foil pressing against the web 38. The variability

could possibly be a result of the layer of air not consistently hugging the web 38 onto the foil.